# The syntax–morphology divide is gradient and sensitive to frequency: Evidence from suspended affixation

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*Tu+11 @ MIT | April 11, 2026*

## 1 Background

**puzzle**

Derivational suspended affixation is neither straight-out impossible nor fully productive. What determines its availability?

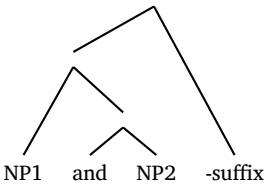
- In suspended affixation (SA), an affix combines with an entire coordinated phrase (1):

(1) a. [kedi ve köpek]-ler
[cat and dog]-PL
'cats and dogs'

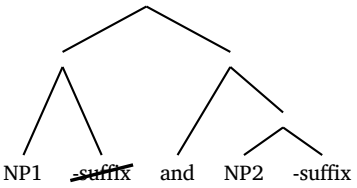
b. [Ali ve Ayşe]-ye bak-tı-m.
[Ali and Ayşe]-DAT look-PST-1SG
'I looked at Ali and Ayşe.'

- Underlying syntax of SA is still debated:

(2) **Base generation**
(Dolatian, 2022; Gong, 2021; Kabak, 2007)




(3) **Ellipsis**
(Despić, 2017; Erschler, 2012; Guseva & Weisser, 2018)




- We will take a less categorical view on possible syntactic analyses.

↳ Our focus: effect of suffix type on SA in Turkish:

▷ Inflectional SA is highly productive (but see Kornfilt, 2012a; Türk, 2025 for restricted cases),

▷ Derivational SA has been argued to be impossible or restricted (4) (Kabak, 2007; Kornfilt, 2012a).

(4) *Derivational word formation does not freely extend to SA:*

a. don-dur-ma
freeze-CAUS-RESULT
'ice cream'
(lit: result of freezing something)

b. kızar-t-ma
roast-CAUS-RESULT
'roasted food'
(lit: result of roasting something)

c. * [don-dur-up kızar-t]-ma
[freeze-CAUS-and roast-CAUS]-RESULT
Intended: 'ice cream and roasted food'
(lit: result of freezing something and result of roasting something; Kornfilt, 2012a:189)

- Kornfilt (2012a): Derivational morphology takes place in the lexicon and is therefore not accessible for syntactic operations like suspended affixation.[1]

- **Notice** grammatical derivational SA (5). The categorical restriction is too strong.

(5) *Apparent grammatical cases of derivational SA:*

a. [ana ve baba]-lık
[mother and father]-DER
'mother- and fatherhood'
(Kabak, 2007:336)

b. [ay-yıldız]-lı bayrak
moon-star-DER flag
'moon-star flag'
(the Turkish flag; Akkuş, 2016:6)

- Early accounts deemed such counterexamples as 'lexicalized' collocations, and not genuine SA.

↳ The coordinations functions as a single conceptual unit stored holistically in the lexicon (Kabak, 2007).

- Akkuş (2016) challenges this categorical restriction with cases that look more productive:

  - Derivational suffixes can apply across coordination, including verbal coordination:

(6) Sıcak tut-ar-ken [dön-üp bak]-tır-t-acak bere model-ler-i.
warm keep-AOR-CVB [turn-and look]-CAUS-CAUS-FUT cap model-PL-CM
'Cap models which while keeping you warm will make others turn and look.'
(Akkuş, 2016:11)

  - Some examples are acceptable regardless of the order of the coordinates, which is difficult to reduce to a fixed lexicalized collocation:

(7) Pijama ✓[üst ve alt]-lık gibi iki unsur-dan oluş-ur.
✓[alt ve üst]-lük
pajama [bottom and top]-DER like two part-ABL comprised.of-AOR
'The pajama is comprised of two pieces, namely top and bottom.'

(8) Eğitim-ler-i boyunca ✓[dost ve arkadaş]-ça bir ortam var-dı.
✓[arkadaş ve dost]-ça
training-PL-POSS during [buddy and friend]-DER an atmosphere exist-PST
'There was a friendly and intimate environment during their training.' (adapted from Akkuş, 2016:9)

  - The suffix can also scope over full phrasal conjuncts, not just bare nouns:

(9) [beş lira ve on dolar]-lık banknot-lar
[five lira and ten dollar]-DER banknote-PL
'5-lira and 10-dollar banknotes' (Akkuş, 2016:9)

- Akkuş takes it to other end: derivational morphology takes place in the syntax.

[1] Kornfilt (2012a) pursues an analysis of suspended affixation that is different from (2) or (3): right-node raising or coordination reduction. For the purposes of this talk, we do not discuss this possibility.

▷ Word formation is syntactic all the way down, in line with Halle and Marantz (1993, 1994).

- **Left unexplained**: why derivational SA is more restricted than inflectional SA, as correctly noted by Kabak (2007) and Kornfilt (2012b).

**going forward**

Tension that needs to be resolved:

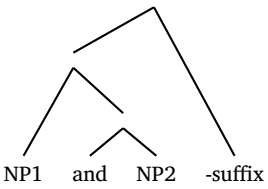
- Strict modularity between syntax and morphology ⇝ no SA with derivational affixes (except for isolated idioms)
- Syntax all the way down ⇝ inflectional and derivational affixes license SA equally
- Our experimental and computational approach:
  - Some derivational affixes allow SA as a function of the frequency of the coordinated phrase.
  - Frequency is integrated into the parser's choice of structure, modelled by MPT.

## 2 Frequency and acceptability

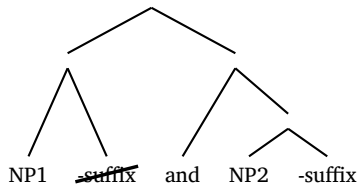
**spoiler**

SA strings are isomorphic, i.e. structurally ambiguous. Frequency biases the parser toward the representation that licenses derivational SA.

(10) Base generation




(11) Ellipsis




- **Component 1:** Derivational affixes can only participate in SA under a base generation analysis:
  - Derivational affixes cohere more tightly with the root, i.e. they are semantically and prosodically more integrated,
    - ▷ Derivational affixes often can create a semantic contrast.
  - As a result, they cannot be targeted by ellipsis: the root+affix unit is too tightly bound to have the affix deleted.
    - ▷ 'Flattened' structures that cannot be targeted by syntax is not new nor interesting (Chomsky, 1961, p. 15); (Chomsky & Miller, 1963, p. 298); (Chomsky, 1965, 196, note 7); (Lasnik & Uriagereka, 2022)
- **Component 2:** Base generation is not free, and high-frequency coordinations bias the parser towards a base generation analysis:

- Speakers store holistic representations of frequently co-occurring coordinated phrases; the more frequent the coordinated phrase is, the more likely it is to be accessed as a unit in processing (Morgan and Levy, 2015, 2016),

- A holistic representation is only compatible with a base generation structure, where the coordination is a constituent.

- When a parser 'corner itself' into an ellipsis analysis, it will judge the sentence as ungrammatical.

- **Key claim:** Frequency affects the acceptability of derivational SA by making one parse more available than another. It does not directly boost acceptability; instead, it shifts the distribution over latent structural analyses. The acceptability is not graded, but the 'structural choice' is graded.

## 3 Experiment

- Acceptability judgment task for coordinated nouns with derivational affixes with SA and in full form on a 6-point Likert scale (6 = acceptable)

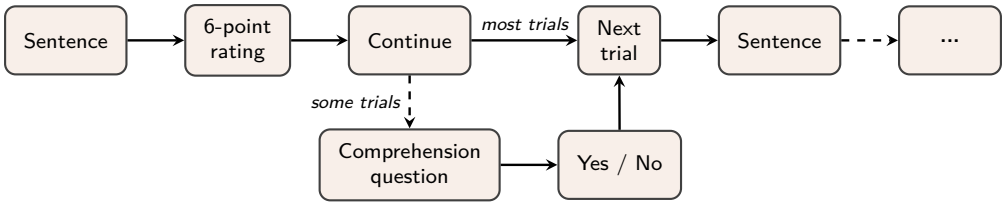



Figure 1: Trial structure in the acceptability judgment task. Each trial presented the full sentence at once, followed by a 6-point acceptability rating. On a subset of trials, participants then answered a yes/no comprehension question before moving to the next trial.

- 2x4 within-subject design, crossing SA and SUFFIX ( *-cI* '-maker', *-lI* '-having', *-lIk* '-for' or *-sIz* '-less')

- Frequency counts of coordinated phrases ranging from 131,657 to 1 (in a Turkish Web 2012 corpus)

- 47 participants, 32 experimental items, 64 fillers.

| SUFFIX | Sentence | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *-cI* '-maker' | Selin | tamir | için | kapı(-cı) | ve | pencere-ci | bir | marangozla | anlaşmış. |
| | S. | repair | for | door-MAKER | and | window-MAKER | a | carpenter | made.a.deal.with |
| | 'Selin agreed with a door-maker and window-maker carpenter for the repair.' | | | | | | | | |
| *-lI* '-having' | Selin | tamir | için | kapı(-lı) | ve | pencere-li | bir | atölye | hazırlamış. |
| | S. | repair | for | door-HAVING | and | window-HAVING | an | atelier | prepared |
| | 'Selin prepared an atelier with a door and a window for the repair.' | | | | | | | | |
| *-lIk* '-for' | Selin | tamir | için | kapı(-lık) | ve | pencere-lik | bir | desen | seçmiş. |
| | S. | repair | for | door-FOR | and | window-FOR | a | pattern | chose |
| | 'Selin chose a pattern for a door and a window for the repair.' | | | | | | | | |
| *-sIz* '-less' | Selin | tamir | için | kapı(-sız) | ve | pencere-siz | bir | atölye | hazırlamış. |
| | S. | repair | for | door-LESS | and | window-LESS | an | atelier | prepared |
| | 'Selin prepared an atelier without a door or a window for the repair.' | | | | | | | | |

Table 1: Example stimuli. Suffixes in parentheses are omitted in forms with SA.

## 3.1 Results

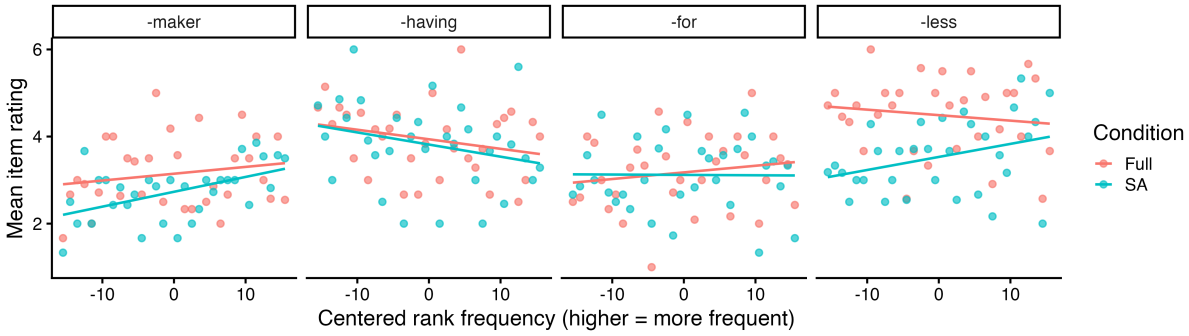



Figure 2: Observed acceptability ratings by suffix, construction type, and frequency rank. Each panel corresponds to one derivational suffix. The gap between the FULL and SA lines shows the surface SA penalty; changes in slope show whether frequency affects the two constructions differently.

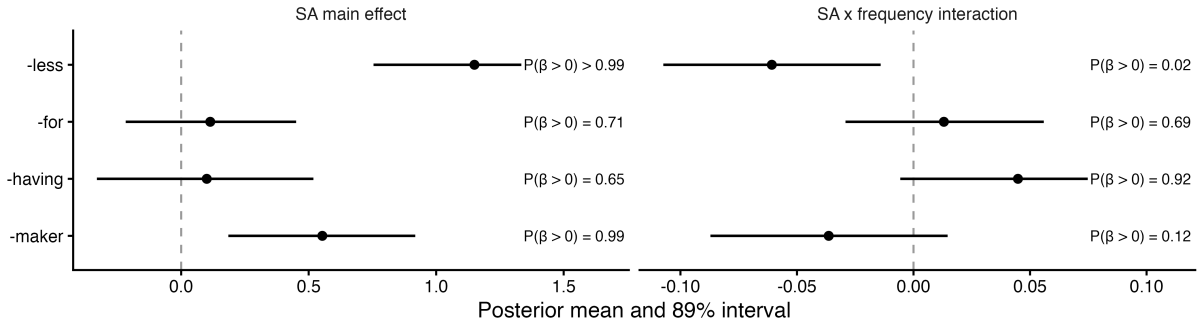



Figure 3: Posterior estimates from the ordinal `brms` model. For the main SA effect, positive values indicate that FULL forms are rated above SA forms. For the frequency interaction, negative values indicate that frequency improves SA forms, namely reduced SA penalty.

- How to read the plots: in Figure 2, the important visual cues are the vertical gap between FULL and SA, and whether the two lines have different slopes. Figure 3 turns those patterns into posterior estimates, along with a quantified 'degree of evidence'.

- The clearest SA penalties are for *-sIz* '-less' ($\hat{\beta} = 1.15$, 89% CrI $[0.75, 1.53]$) and *-cI* '-maker' ($\hat{\beta} = 0.55$, $[0.18, 0.92]$); the estimates are much weaker for *-lI* '-having' (0.10, $[-0.33, 0.52]$) and *-lIk* '-for' (0.11, $[-0.22, 0.45]$).

- Frequency effect:

  - Predicted direction for *-sIz* '-less': $\hat{\beta} = -0.061$, 89% CrI $[-0.107, -0.014]$.

  - Same direction but moderate effect for *-cI* '-maker' ($-0.036$, $[-0.087, 0.015]$); opposite trend for *-lI* '-having' (0.045, $[-0.006, 0.096]$); no evidence for *-lIk* '-for' (0.013, $[-0.029, 0.056]$).

**at least remember these**

- **Takeaway I:** Only suffixes exhibiting SA penalty shows frequency effects.

- **Takeaway II:** a simple "frequency boosts acceptability" story is insufficient, motivating a latent-process model that separates structural route choice from response noise.

## 4 Modelling

Our aim in this section is to situate our experiment results with a modeling considering:

- how experimental measures can pollute the underlying linguistic data
- how structural choices can be affected by item-wise information

### 4.1 *What we know about experiment noise?*

- Psycholinguistic measures like acceptability, reading times, eye-tracking, EEG, or anything else is notorious for not being transparent when it comes to underlying processes or linguistic granualarity (Embick & Poeppel, 2015; Macmillan & Creelman, 2005; Posner, 1978; Sternberg, 1967).
- In addition to incorporating many different processes, they also incorporate cognition general heuristics as well as noise.
- We use the filler items to identify these nuisance processes. The experiment includes 64 fillers, split between clearly grammatical and clearly ungrammatical sentences.
  - **Attentiveness** ($a_j$): How sensitive are you to the experimental conditions?
  - **Yes-bias** ($g_j$): How forgiving are you given the bad trials as a proportion to good trials?

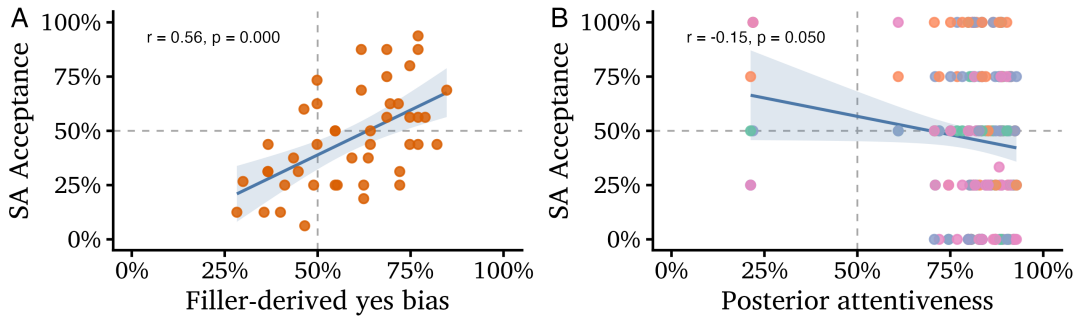


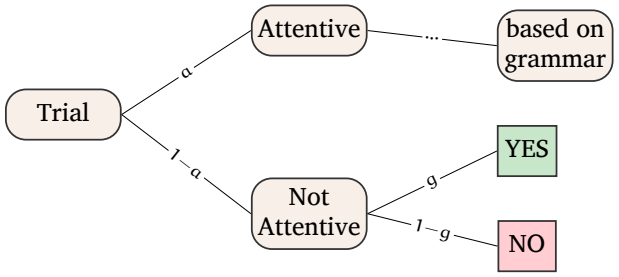

Figure 4: Participant-level yes-bias (A) and attentiveness (B, colored by suffix) against observed SA acceptance. Lines show linear trends across participants

- **Two dangers:** (1) correlating underlying phenomenon dominating results as in Fig4A and (2) outliers driving effects in specific conditions when the data is sparse. *Solution: assume a overt linking hypothesis:*

### 4.2 *Imagine that you are in an experiment*

- And you end up reading the following string:

(12) kapı ve pencere-ci
door and window-MAKER




$a$ Probability of the attentive branch; estimated from filler discrimination.

$1-a$ Probability of the inattentive branch.

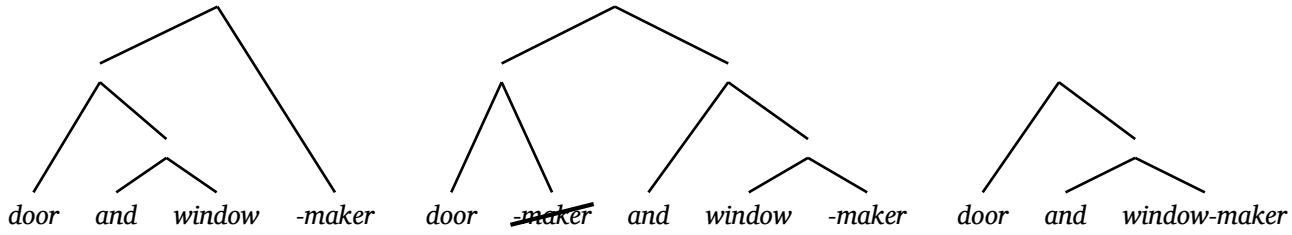
$g$ Yes-rate on inattentive trials (yes-bias); fixed from filler hit/miss ratios via $g = \Phi(-c)$.

*'Acceptable' response can come through grammar in attentive trials or guessing in attentive cases.*

Figure 5: The MPT overt linking hypothesis. The response on any trial is either structurally driven (attentive branch, probability $a$) or noise-driven (inattentive branch, probability $1-a$), with yes-bias $g$ governing guessing.

- Assuming that you are not just looking at random ink spots, and deterministically attempting to understand the structure in the world, *what is the structure you give to such strings?*

- Three parses are possible in principle:




**(a) Base generation**
a maker of doors and windows

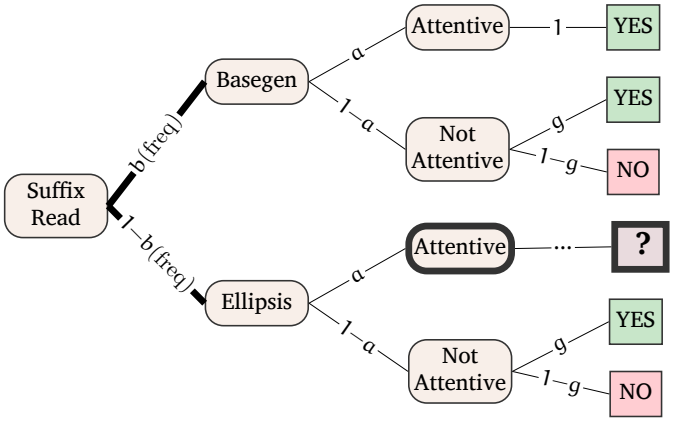
**(b) Ellipsis**
a door-maker and a window-maker

**(c) Only 2nd noun**
a door and a window-maker

- We experimentally controlled against cases such as (c).

- The model focuses on the contrast between (a) and (b): **base generation** vs. **ellipsis** (recall 2–3). With probability $b$, the parser adopts base generation; with probability $1-b$, it adopts ellipsis.

- The MPT encodes this as an unobserved route choice. The routes differ crucially on the attentive ellipsis branch:




Frequency enters as a predictor on the logit scale:

$\text{logit}(b_n) = \alpha_s + \beta_s \cdot \text{freq}_n + u_j + w_i$

A positive $\beta$ means higher coordination frequency increases $b$, namely the probability of the base-generation route that licenses derivational SA.

**under base-generation route:**

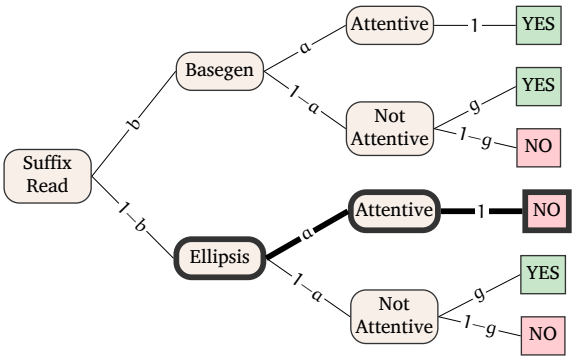
- If you were attentive, everything is okay, structure in (a) is grammatical.
- If you were not attentive, you are going to guess 'yes' or 'no' according to your response bias.

*What happens if you corner yourself into "Ellipsis" Route?*

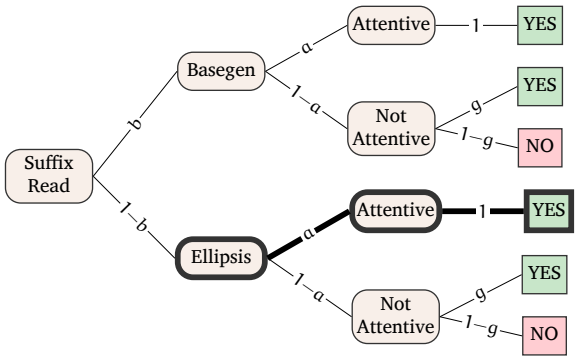
## 4.3 *Integrating categorical differences*

- What happens under Ellipsis analysis might depend on the type of the affix.
  - Inflectional affixes are compatible with ellipsis, while derivational affixes, being more tightly integrated with the root, are not.
  - Recall that your likelihood of being cornering yourself into Ellipsis route is based on the frequency of the coordination.
    - ▷ Therefore, the gradience in acceptability is not coming from the grammar, it is coming from your likelihood of going into the 'unavailable' analysis.

**Derivational SA**




**Inflectional SA**




## 4.4 *Toy model in action*

- **Derivational toy-simulation:** Each scenario assumes 100 SA responses, $a \approx 0.80$, and $g \approx 0.60$. The only thing that varies is $b$, the probability of the base-generation route.

**Scenario A: High** frequency
($b = 0.55$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.55 = 55$ | | |
| → Attentive | $55 \times 0.80 = 44$ | 44 | — |
| → Inattentive | $55 \times 0.20 = 11$ | 7 | 4 |
| $1-b$ ↳ Ellipsis | $100 \times 0.45 = 45$ | | |
| → Attentive | $45 \times 0.80 = 36$ | **0** | 36 |
| $1-b$ ↳ Ellipsis → Inattentive | $45 \times 0.20 = 9$ | 5 | 4 |
| **Total** | **100** | **56** | **44** |

**Scenario B: Low** frequency
($b = 0.25$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.25 = 25$ | | |
| → Attentive | $25 \times 0.80 = 20$ | 20 | — |
| → Inattentive | $25 \times 0.20 = 5$ | 3 | 2 |
| $1-b$ ↳ Ellipsis | $100 \times 0.75 = 75$ | | |
| → Attentive | $75 \times 0.80 = 60$ | **0** | 60 |
| $1-b$ ↳ Ellipsis → Inattentive | $75 \times 0.20 = 15$ | 9 | 6 |
| **Total** | **100** | **32** | **68** |

- Acceptance drops from 56 to 32 as frequency decreases. Every item that ends up on the attentive ellipsis branch is a guaranteed rejection — so the more items land there (low $b$), the worse the totals.

→ **Inflectional SA: frequency does nothing.** Same $b$ values, but ellipsis is fine ($\theta^{ell} = 1$), so both routes accept on attentive trials.

**Scenario C:** Inflectional at **high** frequency
($b = 0.55$, $\theta^{ell} = 1$, $a = 0.80$, $g = 0.60$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.55 = 55$ | | |
| → Attentive | $55 \times 0.80 = 44$ | 44 | — |
| → Inattentive | $55 \times 0.20 = 11$ | 7 | 4 |
| $1-b$ ↳ Ellipsis | $100 \times 0.45 = 45$ | | |
| → Attentive | $45 \times 0.80 = 36$ | **36** | — |
| $1-b$ ↳ Ellipsis → Inattentive | $45 \times 0.20 = 9$ | 5 | 4 |
| **Total** | **100** | **92** | **8** |

**Scenario D:** Inflectional at **low** frequency
($b = 0.25$, $\theta^{ell} = 1$, $a = 0.80$, $g = 0.60$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.25 = 25$ | | |
| → Attentive | $25 \times 0.80 = 20$ | 20 | — |
| → Inattentive | $25 \times 0.20 = 5$ | 3 | 2 |
| $1-b$ ↳ Ellipsis | $100 \times 0.75 = 75$ | | |
| → Attentive | $75 \times 0.80 = 60$ | **60** | — |
| $1-b$ ↳ Ellipsis → Inattentive | $75 \times 0.20 = 15$ | 9 | 6 |
| **Total** | **100** | **92** | **8** |

- Both totals are identical: **92**. Different structural derivations have no observable effect. Frequency only produces an observable effect when the two routes lead to different outcomes.

**when frequency matters**

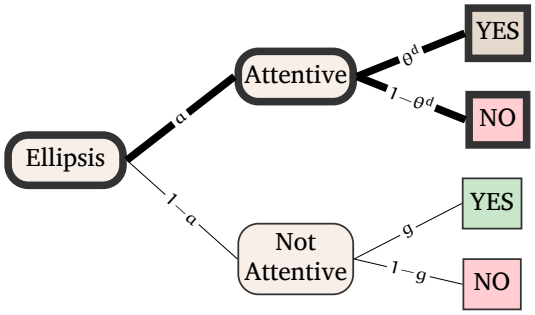
Frequency has an observable effect only when the base-generation and ellipsis routes diverge in their attentive-branch outcomes.

▷ For derivational SA (ellipsis → NO), every route shift matters.

▷ For inflectional SA (both routes → YES), route shifts are invisible in the data.

▷ In such a categorical model, **every suffix** should show a frequency effect: since ellipsis is always rejected, any shift toward base generation must improve acceptance.

- Another possibility is that, *suffixes vary their 'decomposability'*. In a model that acknowledges this, participants can give a "Yes" response even when they went through ellipsis, **if** they were able to decompose the derivational suffix.




(i) **Decomposability** ($\theta^{d}$): how retrievable the suffix is as an ellipsis target, estimated per suffix, independent of frequency.

(ii) **Structural route probability** ($b$ vs. $1-b$): the probability of base generation vs. ellipsis, where coordination frequency is allowed to enter. It is not independent of suffix identity.

## 4.5 *Results from modelling*

- We fit a Bayesian Multinomial Processing Tree model to the thresholded judgments (Erdfelder et al., 2009; Riefer and Batchelder, 1988). Ratings of 4–6 were treated as acceptances, and ratings of 1–3 as rejections.

- The MPT outperforms the binary `brms` baseline ($\Delta\text{ELPD} = 7.47$).
  - **Full-form acceptance in Table 2**
    - ▷ This is the baseline question: if the suffix is fully realized, how acceptable is it?
    - ▷ Here, *-sIz* '-less' and *-lI* '-having' are accepted overall more often compared to *-cI* '-maker' and *-lIk* '-for'.
    - ▷ So before we even talk about SA, the suffixes are already not starting from the same place.

| Full-form acceptance | Suffix | M [89% CrI] |
|---|---|---|
| Attentive P(accept) | *-sIz* '-less' | 0.86 [0.79, 0.92] |
| | *-cI* '-maker' | 0.34 [0.24, 0.44] |
| | *-lI* '-having' | 0.77 [0.69, 0.85] |
| | *-lIk* '-for' | 0.36 [0.26, 0.46] |

Table 2: Full-form acceptance in the MPT model. Posterior means with 89% credible intervals.

  - **SA-form acceptance in Table 3**
    - ▷ This is the model's overall predicted acceptance for the suspended-affix form at mean frequency.
    - ▷ It is lower than the full-form value because SA acceptance depends on an additional structural decision.
    - ▷ Importantly, the forms that are specifically lower are *-sIz* '-less' and *-cI* '-maker'.

| SA-form acceptance | Suffix | M [89% CrI] |
|---|---|---|
| Marginal P(accept) at mean freq. | *-sIz* | 0.49 [0.37, 0.62] |
| | *-cI* | 0.19 [0.11, 0.29] |
| | *-lI* | 0.65 [0.53, 0.76] |
| | *-lIk* | 0.32 [0.23, 0.42] |

Table 3: Model-implied SA-form acceptance at mean frequency.

  - **Ellipsis acceptance in Table 4.**
    - ▷ $\theta^d$ means: if the reader has already taken the ellipsis route, how likely are they to accept the item?
    - ▷ So $\theta^d$ is not frequency, and it is not overall SA acceptability. It is route-specific acceptability due to assumed decomposability metric.
    - ▷ In these results, $\theta^d$ is substantially low for *-cI* and *-sIz* compared to their SA-form acceptance.
    - ▷ On the other hand, for *-lI* and *-lIk*, possible variance overlaps with the SA-form acceptance.

| Ellipsis acceptance | Suffix | M [89% CrI] |
|---|---|---|
| Attentive P(accept) via ellipsis | *-sIz* | 0.33 [0.17, 0.52] |
| | *-cI* | 0.11 [0.04, 0.21] |
| | *-lI* | 0.52 [0.32, 0.70] |
| | *-lIk* | 0.24 [0.11, 0.38] |

Table 4: Ellipsis-route acceptance, i.e. $\theta^d$.

- **Frequency effect on base-generation probability in Table 5**
  - ▷ Frequency enters here, and only here: it shifts the probability of selected structure towards base generation.
  - ▷ *-lIk* does not get affected by frequency.
  - ▷ *-cI* and *-sIz* containing SA-structures are interpreted as a base-generated structures as the frequency increases.
  - ▷ As frequency increases [NP and NP-*lI*] structures are interpreted as ellipsis more often.

| Freq. effect on P(base-gen.) | Suffix | M [89% CrI] |
|---|---|---|
| Logit-scale slope | *-sIz* (P(β>0)=0.83) | +0.08 [−0.06, +0.26] |
| | *-cI* (P(β>0)=0.80) | +0.15 [−0.16, +0.45] |
| | *-lI* (P(β>0)=0.12) | −0.20 [−0.49, +0.08] |
| | *-lIk* (P(β>0)=0.62) | +0.06 [−0.33, +0.43] |

Table 5: Frequency effect on the probability of choosing base generation. Frequency effects are on the logit scale.

## 4.6 *Model's Predictions*

With *-sIz* '-less', the ellipsis route is less taken and not very acceptable, and frequency shifts the parser toward base generation ($P(\beta>0) = 0.83$). So higher frequency helps because it favors the better route.

(13) *high frequency*

| masa(-lı) | ve | sandalye-li | bir | yemek odası |
|---|---|---|---|---|
| table | and | chair-having | a | dining room |

(14) *low frequency*

| fare(-li) | ve | aslan-lı | bir | masal |
|---|---|---|---|---|
| mouse | and | lion-having | a | story |

With *-cI* '-maker', the same logic appears: ellipsis acceptance is very low, and frequency again shifts the parser toward base generation ($P(\beta>0) = 0.80$).

- ▷ Importantly, its acceptability is already low. The relevant effect survives even after accounting for response bias and and route differences.

(15) *high frequency*

| kapı(-cı) | ve | pencere-ci | bir | marangoz |
|---|---|---|---|---|
| door | and | window-maker | a | carpenter |

(16) *low frequency*

| tablo(-cu) | ve | vazo-cu | bir | dükkan |
|---|---|---|---|---|
| painting | and | vase-maker | a | shop |

For *-lIk*, the frequency effect is weak, and both routes are already fairly low in acceptability, so shifting the route mixture does not change surface ratings very much.

(17) *high frequency*

| gece(-lik) | ve | gündüz-lük | bir | program |
|---|---|---|---|---|
| night | and | day-for | a | program |

(18) *low frequency*

| muz(-luk) | ve | havuçluk | bir | saklama kabı |
|---|---|---|---|---|
| banana | and | carrot-for | a | tupperware |

For *-lI*, the frequency effect trends in the opposite direction, which predicts that ellipsis is comparatively more available for this suffix.

(19) *high frequency*

| göz(-lü) | ve | kulaklı | bir | robot |
|---|---|---|---|---|
| eye | and | ear-with | a | robot |

(20) *low frequency*

| tepe(-li) | ve | nehir-li | bir | alan |
|---|---|---|---|---|
| hill | and | river-with | an | area |

## 5 Conclusion

- Why is derivational SA neither straight-out impossible nor fully productive?
  - ↳ Our answer combines two ideas:
    - (Some) derivational affixes are only compatible with a base generation parse,
    - Frequency biases the parser towards base generation.
- Remaining question: why did not all derivational affixes show the predicted effect?
    - The MPT model predicts a frequency effect if and only if an ellipsis parse is blocked.
    - Our idea: whether an affix can be elided depends on how tightly integrated it is with the stem, which depends on how frequently the two co-occur.

(21) a. *Low full-form frequency, loose integration:*
pencere-ci
window-maker
'window maker'

b. *High full-form frequency, tight integration:*
aş-çı
food-maker
'cook'

- What seem to be differences between affixes are actually differences between particular stem-affix *combinations*. To be tested!

| Stem | -lI 'with' | -sIz 'without' | Relation |
|---|---|---|---|
| *kafein* | *kafeinli* | *kafeinsiz* | strong asymmetry: 'without' form is much more entrenched |
| *alkol* | *alkollü* | *alkolsüz* | both forms are highly entrenched / more balanced |

- For future work, we also plan to test the syntactic parse that speakers assign to derivational SA using scope interpretation:

(22) *Ambiguous*
Zeynep biber ve sumak-lı sos yaptı.
Zeynep pepper and sumac-WITH sauce made
a. ✓ Base-generation reading: 'Zeynep made a sauce with both pepper and sumac.'
b. ✓ Ellipsis reading: 'Zeynep made a pepper-sauce and a sumac-sauce.'

(23) *Not-Ambiguous*
Ece benzin ve dizel motor-lu araç aldı.
Ece gasoline and diesel engine-WITH vehicle bought
a. ✗ Base-generation reading: 'Ece bought one vehicle with both a gasoline and a diesel engine'
b. ✓ Ellipsis reading: 'Ece bought a gasoline vehicle and a diesel vehicle .'

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## A Additional Toy models

→ **What if we ignore attentiveness?** Same $b = 0.40$, same $g = 0.60$ — only $a$ changes.

**Scenario E: High** attentiveness
($a = 0.90$, $b = 0.40$, $g = 0.60$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.40 = 40$ | | |
| → Attentive | $40 \times 0.90 = 36$ | 36 | — |
| → Inattentive | $40 \times 0.10 = 4$ | 2 | 2 |
| $1-b$ ↳ Ellipsis | $100 \times 0.60 = 60$ | | |
| → Attentive | $60 \times 0.90 = 54$ | 0 | 54 |
| $1-b$ ↳ Ellipsis → Inattentive | $60 \times 0.10 = 6$ | 4 | 2 |
| **Total** | **100** | **42** | **58** |

**Scenario F: Low** attentiveness
($a = 0.40$, $b = 0.40$, $g = 0.60$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.40 = 40$ | | |
| → Attentive | $40 \times 0.40 = 16$ | 16 | — |
| → Inattentive | $40 \times 0.60 = 24$ | 14 | 10 |
| $1-b$ ↳ Ellipsis | $100 \times 0.60 = 60$ | | |
| → Attentive | $60 \times 0.40 = 24$ | 0 | 24 |
| $1-b$ ↳ Ellipsis → Inattentive | $60 \times 0.60 = 36$ | 22 | 14 |
| **Total** | **100** | **52** | **48** |

- A distracted participant (F) *looks more accepting* than an attentive one (E) — 52 vs. 42 — even though $b$ is identical. The inattentive branch is driven by yes-bias ($g = 0.60$), so more inattention means more yes responses regardless of structure. Without modelling $a$, you would misread this as a difference in grammatical sensitivity.

→ **What if we ignore yes-bias?** Same $b = 0.40$, same $a = 0.80$ — only $g$ changes.

**Scenario G: High** yes-bias
($g = 0.80$, $b = 0.40$, $a = 0.80$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.40 = 40$ | | |
| → Attentive | $40 \times 0.80 = 32$ | 32 | — |
| → Inattentive | $40 \times 0.20 = 8$ | 6 | 2 |
| $1-b$ ↳ Ellipsis | $100 \times 0.60 = 60$ | | |
| → Attentive | $60 \times 0.80 = 48$ | 0 | 48 |
| $1-b$ ↳ Ellipsis → Inattentive | $60 \times 0.20 = 12$ | 10 | 2 |
| **Total** | **100** | **48** | **52** |

**Scenario H: Low** yes-bias
($g = 0.30$, $b = 0.40$, $a = 0.80$)

| Path through tree | Count | YES | NO |
|---|---|---|---|
| $b$ ↳ Basegen | $100 \times 0.40 = 40$ | | |
| → Attentive | $40 \times 0.80 = 32$ | 32 | — |
| → Inattentive | $40 \times 0.20 = 8$ | 2 | 6 |
| $1-b$ ↳ Ellipsis | $100 \times 0.60 = 60$ | | |
| → Attentive | $60 \times 0.80 = 48$ | 0 | 48 |
| $1-b$ ↳ Ellipsis → Inattentive | $60 \times 0.20 = 12$ | 4 | 8 |
| **Total** | **100** | **38** | **62** |

- A 10-point swing (48 vs. 38) from yes-bias alone, with identical $b$ and $a$. A lenient responder (E) looks like they accept the structure more, when in fact they are just more willing to say yes when not paying attention. Without modelling $g$, yes-bias inflates estimated acceptance and can create spurious differences between participants or conditions.